SEGMENTATION STUDY

PURPOSE

The purpose of the Segmentation study is to classify the facilities of the FCRTS and to assign them to different categories of service, or segments, according to the types of services they provide. The associated investment and O&M for each segment is then determined.

The outcome of this study is the segmented TBL historical and projected transmission investment base, and historical O&M expense for each segment. These results are inputs to the Revenue Requirement Study, where the segmented revenue requirements are determined for transmission and ancillary services.

METHODOLOGY

1. No major changes are proposed from the 2002 Final Segmentation Study.
2. TBL transmission facilities are classified to segments on the basis of voltage and function. The facilities are grouped and assigned by functional unit as lines, transformers, terminals, capacitors, and circuit breakers. A number of technical sources are relied upon to identify facilities for specific services. In some cases, as for Interties, contracts define some or all of the facilities in a segment.
3. After the facilities are identified by segment, the investment cost of each segmented facility is determined from accounting records.
4. Some substation facilities are common to more than one segment. In that case, the facility costs are divided among the major segments based on the use of each major component of the substation.
5. Historical investment is through September 30, 2003. FY04 data should be available for use in the final rate proposal.
6. Projected plant investment through FY2007 is also segmented and included in the study.
7. Investment and O&M associated with providing the FERC defined Ancillary Services are projected and segmented. These costs are further sub-segmented to the six individual services.
8. O&M expenses for each transmission line and substation are obtained from the plant records for the latest 3 years for which data is available and then averaged. O&M cost assignments are based on an analysis of direct maintenance and operations costs.
9. A three-year average of O&M for 2001, 2002, and 2003 will be used for the initial rate proposal (the preliminary O&M figures attached are based on results of the 2002 Segmentation Study).

PRELIMINARY RESULTS (Tables attached)

1. Investment by segment for plant in service as of 9/30/03 (see page 5).
2. Historical O&M by segment, based on results of the 2002 Segmentation Study. Initial proposal will be based on years 2001, 2002, and 2003 (see page 6).
3. Projected plant-in-service for Ancillary Services through 2007 (see page 8)
4. Also included are segmented results from the Revenue Requirement Study (see pages 7, 9).

Results may change for initial proposal.

THE SEGMENTS

1. Generation Integration (GI) – connects federal generation to the Network
2. Integrated Network (Network) – bulk power transmission
3. Southern Intertie – AC and DC connections to California
4. Eastern Intertie – Garrison-Townsend 500 kV line and equipment
5. Utility Delivery – facilities to deliver power to publics at less than 34.5 kV
6. Industrial Delivery (DSI) - facilities to deliver power to DSIs at less than 34.5 kV
7. Ancillary Services – facilities and operations necessary for reliable transmission service.

Following are more detailed descriptions of the segments

Generation-Integration Segment

The Generation-Integration segment consists of all facilities that connect the Federal generating plants to the integrated BPA transmission network. The segment includes transmission lines and equipment between the generator bus and the first BPA transmission system substation encountered by the generated power. Substation terminal equipment such as disconnect switches, circuit breakers, and lightning arresters are included in the segment. The federal generator step-up transformers are included in this segment, but these are owned by the COE and USBR and not by BPA. The step-up costs are included in the PBL revenue requirement.

Integrated Network Segment

The Integrated Network segment consists of the facilities that transfer bulk power to and from the Delivery and Southern and Eastern Intertie segments. These facilities consist almost entirely of lines and substation equipment at voltages from 34.5-kV to 500-kV owned and operated by BPA.

These facilities integrate major system resources directly or in conjunction with either BPA's Generation-Integration facilities or interconnections with other utilities. The Integrated Network provides bulk power transfers between service areas, voltage regulation, and overall reliability resulting from alternative transmission pathways.

Pacific Northwest-Southwest (Southern) Intertie Segment

This segment is a system of transmission lines that interconnect the PNW to California power systems at the Oregon border. The Southern Intertie consists of one 1000-kV direct-current line from the Celilo Converter Station at The Dalles, and a set of 500-kV alternating-current (A-C) lines originating in North Central Oregon. BPA owns most of the Intertie facilities north of the California-Oregon and Nevada-Oregon borders except for:

1. One of the A-C lines (from Malin to Grizzly substation in central Oregon), and associated terminals owned by Portland General Electric Company; and
2. The Meridian-Captain Jack-Malin line and Summer Lake-Malin line owned by PacifiCorp. BPA has rights to use these facilities for Intertie purposes.

The Southern Intertie segment includes the following major facilities:

1. The Celilo converter station;

2. The supply lines from John Day to Big Eddy to Celilo and associated substation facilities;
3. The two John Day-Grizzly lines and a Grizzly-Malin 500-kV line with associated terminal facilities;
4. Series compensation stations at Sycan, Fort Rock, and Sand Spring;
5. Fifty-seven percent of the Buckley-Summer Lake 500-kV line and associated substation facilities (the remaining 43 percent is allocated to Integrated Network. This allocation is based on past usage, which may change in future filings);
6. The braking resistor at Chief Joseph, used for Intertie stability control; and
7. The Third AC Intertie project facilities which consist of:
    a. Modifications to existing AC Intertie facilities;
    b. Existing facilities originally segmented to Network but currently dedicated to Intertie use since commercial operation of the last 800 MW of the upgrade (One half of Marion-Alvey line and one quarter of Buckley-Marion line along with corresponding terminal facilities);
    c. Captain Jack Substation in Southern Oregon; and
    d. The one half of the Alvey-Meridian 500-kV line and associated terminal facilities owned by BPA.

Eastern Intertie Segment

The Eastern Intertie segment consists of the Garrison-Townsend 500 kV line and the associated substation facilities at Garrison. These facilities are used to connect power generated at Colstrip to the BPA Northwest and to transfer power between the Northwest and Montana. Most of the costs of this Intertie are recovered from the Montana Power Company and the Colstrip owners that contracted for service on this line.

Delivery Segments

The Delivery segment consists primarily of substation facilities required to "step down" (reduce) from prevailing transmission voltages for delivery to customers at voltages below 34.5kV. These facilities are generally located at the points of delivery. They differ from Network in that they deliver power to a limited geographical area and serve one or two customers at the delivery point. Step-down transformers and associated switching and protection equipment constitute the primary facilities included in these segments.

These facilities are subdivided into Utility Delivery and Industrial Delivery. The facilities in each of these are substantially different in size and use. There are a few facilities used to deliver to IOU customers below 34.5 kV where the delivery costs are covered in older contracts. These facilities are combined with the Network segment.

Utility Delivery Segment

This segment consists of the facilities required to supply power at delivery voltages to BPA's public utility customers. These utilities have loads that vary during the year and have potential for growth. In addition to substation equipment, these facilities include a few short lines typically at 12.5 or 13.8-kV.

Industrial Delivery (DSI) Segment

This Delivery segment consists of facilities required to supply BPA's industrial customers. They consist mostly of substations that reduce transmission voltage to supply voltage below 34.5-kV. This type of customer has a high load factor contributing to a high usage of the equipment. The loads are large with an upper limit on the load served.

Ancillary and Control Area Services

These are services that the transmission provider must supply as specified by FERC. These are services necessary for reliable transmission service on the FCRTS. Control Area Services are charged to customers without a transmission agreement, but are the same as Ancillary Services. The facilities that provide these services are the control equipment and computer hardware and software located primarily at the control centers, and the communications system and SCADA equipment connecting to the facilities being controlled. In order to determine the revenue requirement for separate ancillary service rates, the facilities that provide these services are included in a separate Ancillary Services Segment, with the facilities further divided into a sub-segment for each service. The Ancillary Services Segment contains only facilities in general plant accounts, primarily communications, control equipment, and computer hardware and software. The investment for this type of equipment is allocated to each ancillary service sub-segment or the transmission segments based on its use. The investment allocated to the transmission system is assigned to each transmission segment proportional to the segment's net plant. The O&M costs are for control center operations and transmission scheduling. The budgets for these functions were reviewed by staff familiar with the operations and assigned to the appropriate service.

The six Ancillary Services are:
- Scheduling, System Control, and Dispatch
- Reactive Supply and Voltage Control from Generation Sources
- Regulation and Frequency Response
- Energy Imbalance
- Operating Reserves – Spinning
- Operating Reserves – Supplemental

The Control Area Services are:
- Generation Imbalance
- Regulation and Frequency Response
- Operating Reserves – Spinning
- Operating Reserves – Supplemental

SUMMARY OF SEGMENTED INVESTMENT
As of September 30, 2003
($)

Segment	ID	2003 Lines	2003 Subs	2003 Total	1998 Lines 1/	1998 Subs 1/	1998 Total 1/	% Change Line	% Change Sub	% Change Total
DSI Delivery	DSI	0	71,345,240	71,345,240	0	88,154,482	88,154,482	0.0%	-19.1%	-19.1%
Generation integration	GI	16,679,687	42,852,521	59,532,208	16,556,553	43,361,401	59,917,954	0.7%	-1.2%	-0.6%
Eastern Intertie	IE	98,857,079	23,866,195	122,723,274	97,890,490	23,866,195	121,756,685	1.0%	0.0%	0.8%
Southern AC Intertie	ISAC	167,608,240	157,075,313	324,683,553	168,283,191	160,697,655	328,980,846	-0.4%	-2.3%	-1.3%
Southern DC Intertie	ISDC	29,157,322	347,301,571	376,458,893	29,095,036	309,856,051	338,951,087	0.2%	12.1%	11.1%
Network	N	1,738,416,695	1,418,559,866	3,156,976,561	1,650,320,068	1,292,779,262	2,943,099,330	5.3%	9.7%	7.3%
Utility Delivery	Del	31,479	35,295,818	35,327,297	31,483	88,282,645	88,314,128	0.0%	-60.0%	-60.0%
Total		2,050,750,501	2,096,296,524	4,147,047,025	1,962,176,821	2,006,997,690	3,969,174,511	4.5%	4.4%	4.5%

1/ 1998 Segmented Investment is from the 2002 Final Segmentation Study. Shown for comparison purposes.

SUMMARY OF SEGMENTED THREE-YEAR AVERAGE O&M

For the Period 1996-1998 1/

($)

Segment	ID	Lines	% of Tot	Substations	% of Tot
DSI Delivery	DSI	0	0.00%	1,421,696	3.16%
Generation integration	GI	578,458	0.99%	776,887	1.73%
Eastern Intertie	IE	923,895	1.58%	215,064	0.48%
Southern AC Intertie	ISAC	2,528,390	4.33%	1,686,416	3.75%
Southern DC Intertie	ISDC	1,494,271	2.56%	8,493,890	18.87%
Network	N	52,801,201	90.52%	31,426,679	69.80%
Utility Delivery	Del	4,155	0.01%	1,002,691	2.23%
Total		58,330,370	100.00%	45,023,322	100.00%

The percent by segment is used to assign budgeted O&M costs for the test period.
The segmented O&M costs are primarily direct costs and do not include all overheads.

Notes:
1/ Results from the 2002 Segmentation Study, with the Delivery segment O&M adjusted to reflect facilities sold as of 9/30/03.
Data from 2001, 2002, 2003 will be used for the initial proposal.

TRANSMISSION RATE CASE WORKSHOP
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August 5, 2004

SEGMENTED TRANSMISSION REVENUE REQUIREMENTS
($thousands)

	A	B	C	D	E	F	G	H
FY 2006	**TOTAL**	**GI**	**NETWORK**	**SOUTH INTER**	**EAST INTER**	**UTIL DELIV**	**DSI**	**ANCILL SERV**
1 Operations & Maintenance	267,342	2,629	169,457	27,555	2,210	1,928	2,758	60,805
2 Inter-Business Line Expenses	74,148	29	7,518	616	8	250	54	65,673
3 Depreciation	204,196	2,489	135,404	29,238	4,169	1,199	3,139	28,558
4 Net Interest Expense	159,459	2,076	127,107	18,225	2,549	853	2,598	6,051
5 Planned Net Revenues	15,928	216	12,561	1,897	265	89	270	630
6 Total Transmission Rev Req	721,073	7,439	452,047	77,531	9,201	4,319	8,819	161,717

	A	B	C	D	E	F	G	H
	TOTAL	**GI**	**NETWORK**	**SOUTH INTER**	**EAST INTER**	**UTIL DELIV**	**DSI**	**ANCILL SERV**
FY 2007								
7 Operations & Maintenance	266,743	2,585	166,897	27,088	2,173	1,900	2,711	63,389
8 Inter-Business Line Expenses	74,148	29	7,518	616	8	250	54	65,673
9 Depreciation	217,180	2,480	145,067	30,303	4,143	1,212	3,101	30,874
10 Net Interest Expense	178,406	2,081	144,421	19,795	2,507	872	2,565	6,165
11 Planned Net Revenues	1,287	16	1,032	148	19	7	19	46
12 Total Transmission Rev Req	737,764	7,191	464,935	77,950	8,850	4,241	8,450	166,147

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ANCILLARY SERVICES
PLANT-IN-SERVICE
($THOUSANDS)

	FERC ACCOUNT			FY 2003	FERC ACCOUNT			FY 2004	FERC ACCOUNT			FY 2005	FERC ACCOUNT			FY 2006	FERC ACCOUNT			FY 2007
	353	391.3	397	TOTAL	353	391.3	397	TOTAL	353	391.3	397	TOTAL	353	391.3	397	TOTAL	353	391.3	397	TOTAL
1 Sched, Syst Control, and Disp Serv	56,511	24,260	147,733	228,504	62,764	32,052	151,017	245,833	74,098	37,334	154,060	265,492	89,194	42,579	157,081	288,854	103,478	47,952	160,950	312,380
2 Reactive Supply and Volt Control	2,085		3,444	5,529	2,293	0	3,581	5,874	2,671	0	3,708	6,379	3,174	0	3,834	7,008	3,650	0	3,995	7,645
3 Regulation and Freq Response	2,173	768	16,266	19,207	2,520	768	17,087	20,375	3,150	768	17,848	21,766	3,989	768	18,603	23,360	4,783	768	19,570	25,121
4 Energy Imbalance				0	0	0	0	0	1	0	0	1	3	0	0	3	6	0	0	6
5 Op Reserve - Spinning Reserve	1,105	384	879	2,368	1,174	384	879	2,437	1,300	384	879	2,563	1,468	384	879	2,731	1,627	384	879	2,890
6 Op Reserve - Supplem Reserve	1,142	384	879	2,405	1,211	384	879	2,474	1,337	384	879	2,600	1,505	384	879	2,768	1,664	384	879	2,927
7 Total Plant-in-Service	63,016	25,796	169,201	258,013	69,962	33,588	173,443	276,993	82,557	38,870	177,374	298,801	99,333	44,115	181,276	324,724	115,208	49,488	186,273	350,969

PLANT ADDITIONS

	FERC ACCOUNT			2004	FERC ACCOUNT			2005	FERC ACCOUNT			2006	FERC ACCOUNT			2007
	353	391.3	397	TOTAL	353	391.3	397	TOTAL	353	391.3	397	TOTAL	353	391.3	397	TOTAL
8 Sched, Syst Control, and Disp Serv	6,253	7,792	3,284	17,329	11,334	5,282	3,043	19,659	15,096	5,245	3,021	23,362	14,284	5,373	3,869	23,526
9 Reactive Supply and Volt Control	208		137	345	378		127	505	503		126	629	476		161	637
10 Regulation and Freq Response	347		821	1,168	630		761	1,391	839		755	1,594	794		967	1,761
11 Energy Imbalance	0		0	0	1		0	1	2		0	2	3		0	3
12 Op Reserve - Spinning Reserve	69		0	69	126		0	126	168		0	168	159		0	159
13 Op Reserve - Supplem Reserve	69		0	69	126		0	126	168		0	168	159		0	159
14 Total AS Additions	6,946	7,792	4,242	18,980	12,595	5,282	3,931	21,808	16,776	5,245	3,902	25,923	15,875	5,373	4,997	26,245
15 Transmission	5,690	9,484	15,230	30,404	5,743	11,182	14,586	31,511	6,464	7,008	14,143	27,615	6,364	7,154	16,447	29,965
16 Total Additions	12,636	17,276	19,472	49,384	18,338	16,464	18,517	53,319	23,240	12,253	18,045	53,538	22,239	12,527	21,444	56,210

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REVENUE REQUIREMENTS FOR ANCILLARY SERVICES
($in thousands)

		A	B	C	D	E	F	G
	FY 2006	**Total Ancillary Services**	**Scheduling, Syst Control, & Dispatch**	**Reactive Supply & Volt Control**	**Regulation & Freqncy Response**	**Energy Imbalance**	**Op Resrv Spinning**	**Op Resrv Supplmtl**
1	Direct O&M	32,800	30,870	600	1,250	0	40	40
2	Overheads	28,005	26,357	512	1,067	0	34	34
3	Total O&M	60,804	57,227	1,112	2,317	0	74	74
4	Generation Inputs	65,673	0	25,000	11,622	0	14,525	14,526
5	Depreciation	28,558	25,862	518	1,660	0	257	261
6	Net Interest	6,051	5,348	141	465	0	48	49
7	Planned NR	630	557	15	48	0	5	5
8	Total Rev Req	161,716	88,994	26,786	16,112	0	14,909	14,915

		Total Ancillary Services	**Scheduling, Syst Control, & Dispatch**	**Reactive Supply & Volt Control**	**Regulation & Freqncy Response**	**Energy Imbalance**	**Op Resrv Spinning**	**Op Resrv Supplmtl**
	FY 2007							
9	Direct O&M	33,690	31,710	620	1,280	0	40	40
10	Overheads	29,699	27,954	547	1,128	0	35	35
11	Total O&M	63,389	59,664	1,167	2,408	0	75	75
12	Generation Inputs	65,673	0	25,000	11,622	0	14,525	14,526
13	Depreciation	30,874	28,009	561	1,765	0	268	271
14	Net Interest	6,165	5,448	144	474	0	49	50
15	Planned NR	46	41	1	4	0	0	0
16	Total Rev Req	166,147	93,162	26,873	16,273	0	14,917	14,922